(3) It makes sense to test fibres with workplace like dimensions,—for example, because a significant difference may exist between the carcinogenic potency of dust from a glass microfibre type with a moderately soluble chemical composition and much thicker inhalable fibres from insulation wools of the same chemical composition. The thicker fibres persist longer because they need more time to dissolve; accordingly, the induced tumour rate is significantly higher (compare type B-09-0-6 and B-09-2-0 in table 2). But there is no significant difference between the carcinogenicity of different diameters when the glass composition is relatively durable (compare type B-20-0-6 and B-20-2-0 in table 2).

It should be borne in mind that, on the one hand, the capacity of the intraperitoneal test model is certainly much larger than that of other models; on the other hand, as far as we know, the capacity may be limited at about 1000 mg dust, because the contact between cells and dust particles cannot be enhanced infinitely by higher masses. We do not have experience with masses higher than 1000 mg. This means that long and thick inhalable fibres which may be relevant to some extent in the work area cannot be tested with the same fibre number as thinner and shorter fibres.

(4) Up to now, important data from Collier have not been published which would allow us to judge whether life spans of rats after intraperitoneal injection suggest that the maximum tolerated doses have been exceeded. We have strong doubts that Collier's interpretation of her results is correct because our comprehensive data base on survival times of controls and rats injected with fibres speaks unequivocally against this suggestion. Similar conclusions were drawn from our data by McConnell⁹ but they were refuted as unwarranted.¹⁰

The maximum tolerated dose for an intraperitoneal carcinogenicity study with fibres has been exceeded when the lifetime of a group was reduced because of fibrosis or adhesions in the abdominal cavity. The mass dose of this maximum tolerated dose depends on the inflammatory and fibrogenic activity of the respective dust sample tested. In any case, this maximum tolerated dose is much higher than the 1.5 mg discussed by Collier *et al.*¹¹ But this does not mean that the observed tumours are non-specifically induced. Asbestos workers with severe asbestosis have a reduced life expectancy too. Nevertheless, they can die with a lung tumour or mesothelioma from asbestos. There are no signs of non-specific carcinogenicity in rats by intraperitoneal overloading with high amounts of non-fibrous dusts. Non-fibrous silicon carbide (1000 mg) or 125 mg B-01 glass fibres did not enhance the carcinogenicity of 0.5 mg crocidolite. Maximum tolerated dose of fibres may be reached with 1000 mg.

Even Collier disproves, with the zero effect of 55 mg of short MMVF-11, her earlier interpretation of our intraperitoneal tumours as non-specific. It seemed to Collier *et al.* "that only the first 1.5 mg of fibres in each intraperitoneal injection reaches the cells at risk, the rest being responsible for an inflammatory reaction."¹¹ They think that doses higher than 1.5 mg tend to produce rapidly infiltrating sarcomas. If this interpretation were true, Collier should have found many sarcomas after injection of 55 mg of short MMVF-11.

Collier mentions that she is restricted to a

maximum of four weekly injections of < 45 mg; but this limit only applies to her current project licence. The restriction is not absolute but is due to her proposal; it can be higher or lower in a different proposal according to the study design.

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Occupational medicine: the way ahead

Editor—I have read with interest the series of articles on *Occupational medicine: the way ahead*. It is indeed an exciting period of transition for occupational medicine. With employers increasingly being made aware of their legal responsibilities, and both employees and the general public becoming better informed about health, safety, and environmental issues, there is a window of opportunity in which to ensure that future service provision keeps pace with change, and meets the needs not only of our own nation but the wider global community.

As experts in our field we need to ensure that we are able to provide the best service possible in what is a constantly evolving and complex discipline. Within this requirement is a need to realise the limits of our own competence and to be willing and able to seek advice from specialists in other disciplines. Even for occupational physicians working in a specific type of industry, there is a constant need to expand and update our knowledge base, with the introduction of new products and processes, and the challenge of new legislation. For many practitioners the need to generate income brings us into contact with a much wider range of occupational health and safety problems. We clearly have responsibility for both the physical and psychological wellbeing of those within the workplace, but are also required to consider the impact of psychosocial issues on health, and increasingly the environmental impact of industrial problems on the general population.

Disasters such as the Braer tanker, Bhopal, and Chernobyl illustrate the potential consequences of lack of vigilance in safety and health matters. There is always the danger of similar events occurring when we are ill informed of all the issues, or are not keeping pace with new developments within our field. We should also be striving to ensure that progress within the field of occupational medicine is not limited to our industry or locality, but that information is shared across a wider industrial community and translated into formulae which can be practically applied in the developing world.

Epidemiology has provided us with valuable information about the distribution and determinants of many occupational diseases, enabling at risk groups to be identified and risk limitation measures developed. Studies of occupational groups have often been limited by poor quantification of exposure, due to lack of assessment skills, or appropriate monitoring devices, or failure to recognise the need for exposure assessment within study design. Liaison with occupational hygienists, and other specialists such as mineralogists and chemists, can ensure that monitoring methods are appropriate, and where deficiencies exist our combined knowledge can be helpful in developing new techniques. Elements of good study design and interpretation of complex data can be just some of the beneficial outcomes of discussions with an expert statistician. The establishment of clear exposure-response relations by adequate data collection and analysis will assist future planning of services and prioritising of resources, by targeting risks appropriately.

The emphasis on individual exposures and susceptibility highlights the need for techniques and models which are better able to measure such variables. The development of biomarkers to detect the impact of exposure on individual people at a cellular level is an important way ahead, and tests which have direct relevance in the workplace must be the aim. Physiologically based pharmacokinetic models can allow us to explore the impact of toxic substances on human systems, rather than relying on extrapolation from animal studies in which routes of metabolism and tumour susceptibility often show great variation between species. Occupational hygienists and toxicologists are leading the way in this field, and we have a role to contribute in our knowledge of disease mechanisms, and workplace implications.

On a more practical level, we should strive to develop quality systems within occupational medicine. There is a need to ensure that our practices and policies are in line with recognised standards and when these do not exist, to pool our knowledge with other specialists to develop such systems. Close liaison with occupational hygienists can help to ensure the implementation of cost effective programmes and compliance with expanding legislation. Stress in the workplace is a topic of much concern and is recognised to be multifactorial in origin, with aspects both of the physical and psychological environment contributing. The role of ergonomists in advising on workplace design and work processes and the contribution of occupational psychologists in considering interpersonal and individual management styles and coping strategies should be recognised.

The information which is available from toxicologists and other related scientists on the subject of workplace and environmental exposures can ensure that we are able to give accurate advice on the true impact of events on a population; it can avoid media embarrassment, limit costs of the current event, and potentially avoid heavy litigation costs at a future date. In the main, we are already members of multidisciplinary teams within the workplace, working closely with occupational health nurses, safety practitioners, personnel managers, and—for example, physiotherapists. In seeking to develop our specialty we cannot afford to be isolationist. We have a natural role within teams, and can enhance our role and knowledge base by working with and seeking the advice of those from a wider range of disciplines.

Although such multidisciplinary groups are currently rare, they do exist, and there are individual specialists around the country who can provide similar advice. The opportunity of working in such an environment has enhanced my knowledge of the scope and complexity of the field of occupational medicine. As physicians, our skills are complementary to all of these disciplines, and we have a valuable part to play in this multidisciplinary setting. We are likely to find that such a contribution increases our job satisfaction, enhances our skills, and establishes a valuable input into the future of our specialism, which is unique within the medical profession.

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NOTICES

3rd Annual Western Retreat: Practical Primary Care. 17–19 November 1996. The Silverado, Napa, California

This continuing medical education course is sponsored by Scripps Clinic and Research Foundation and designed for physicians interested in updating their clinical knowledge on various topics about primary care and internal medicine. The combination of lectures and discussion in a relaxed atmosphere will enhance the learning experience. The course will offer 12 hours of category 1 CME credit.

For further information contact: Department of Academic Affairs, 403C,

Scripps Clinic and Research Foundation, 10666 N Torrey Pines Road, La Jolla, CA 92037, USA. Tel (619) 554-8556; Fax (619) 554-6310.

IOSH '96 Health and safety conference and exhibition. 2–4 December 1996. Harrogate, Yorkshire

Europe's leading professional health and safety body's prestigious annual conference and exhibition will be held at the Harrogate International Centre, the Institution of Occupational Safety and Health's conference takes as its theme this year: *Duty of care*.

A strong line up of high calibre speakers is now being finalised for the conference. The keynote address at IOSH '96 will be delivered by David Eves, deputy director general, Health and Safety Executive. Other speakers already confirmed for the three day event include: Owen Tudor of the TUC, who will concentrate on empowerment of the safety practitioner; Alan Rickman of Willis Corroon Hinton, focusing on health, safety and environmental management; and Nick Burraston of Powergen, who will discuss benchmarking.

The conference is structured around formal presentations covering a comprehensive range of subjects as well as a series of more informal workshop sessions. Workshop topics will be:

- Continual improvement of project process (CIPP)
- Construction (design and management) regulations
- Accident investigation systems
- Counselling in the workplace
- Cost/benefit analysis
- Role of the expert witness
- BS 8800—safety management
- IOSH membership and new OSH qualifications

For further information, contact: Deborah Fisher, Tel + 44 (0) 116 257 1399, ext 109, e-mail: cpdevnts@iosh.co.uk.

The programme will appear on IOSH's home page (<http://www.iosh.co.uk>) by the end of June.

Conference delegates will have free access to IOSH's exhibition. More details are available from Tony Bond or Dave Bishop at Paramount Exhibitions, Tel + 44 (0) 181 207 5599.

Clinical haematology and oncology: 1997. 17–20 February 1997. Sheraton Grande Torrey Pines Hotel, La Jolla, CA, USA

This continuing medical education conference is sponsored by Scripps Clinic and Research Foundation and designed for haematologists, medical oncologists, internists, pathologists, and paediatricians interested in the diagnosis and management of haematological and oncological disorders. An outstanding faculty from across the country has been assembled to discuss various aspects of these fields, to aid clinicians in sorting out the important from the trivial, and to help identify those recent advances which will withstand the test of time. 26 Hours category 1 CME credit available.

For further information contact: Department of Academic Affairs, Box 403C, Scripps Clinic and Research Foundation, 10666 N Torrey Pines Road, La Jolla, CA 92037, USA. Tel (619) 554-8556; Fax (619) 554-6310.

Continuing education program schedule, 1996–97 of the Northwest Center for Occupational Health and Safety, Department of Environmental Health, University of Washington, Seattle, WA, USA

16–18 October Northwest occupational health conference: quality in occupational health and safety.

23 October Health and safety programs for the information age (Governor's safety and health conference, Spokane, WA).

7–8 and 12–13 November NIOSH 596: ergonomics of occupational hand-arm and whole-body vibration.

5 December Scientists in the courtroom: the role of the expert witness.

16 January 1997 Toxicology for non-toxicologists.

29–31 January Hazardous waste annual refreshers.

24–28 February Non-ionising radiation.

20 March Health and safety programs in the workplace.

21 March Advances in occupational and environmental medicine.

3–4 April Agricultural safety and health (Yakima, WA).

16–18 April Managing hazardous materials events (Spokane, WA).

8 May Advances in ergonomics: overview of the science.

9 May Advances in ergonomics: improved techniques for practitioners.

5 June Health hazards in machining operations.

16–20 June Sampling and evaluating airborne asbestos dust.

For further information: (206) 543-1069; e-mail: ce@u.washington.edu.

Epidemiology and prevention of infectious diseases. 6–8 February, 1997. Fairmount Hotel Atop Nob Hill, San Francisco, California

This programme provides an overview of the scope and methods used in infectious disease epidemiology and research, the unique aspects of hospital epidemiology and infection control, and the epidemiology and prevention of specific infectious diseases. The programme is designed for all practitioners in the disciplines of epidemiology, public health, health administration, medicine, nursing, and related professions.

The format features lectures and discussion with faculty. Topics to be covered include:

- HIV Infection
- Tuberculosis
- Sexually transmitted disease
- Meningitis
- Lyme disease
- Haemophilus influenzae infection

Chaired by John E Conte, Jr, MD, this programme is presented by the Department of Epidemiology and Biostatistics of the University of California School of Medicine at San Francisco. The programme is sponsored by UCSF's Office of Continuing Medical Education.

UCSF is accredited by the Accreditation Council for Continuing Medical Education. This programme will meet the criteria for category 1 credit.

For further information, contact: The Office of Continuing Medical Education, Room MCB-630, University of California, San Francisco, California 94143-0742, (415) 476-4251.